# FIVE-YEAR REVIEW REPORT

**First Five-Year Review Report**
**for**
**Red Oak Landfill Superfund Site**
**City of Red Oak**
**Montgomery County, Iowa**

**September 2002**

**Prepared by:**

**U.S. Environmental Protection Agency**
**Region 7**
**Kansas City, Kansas**

Approved by:

Michael J. Sanderson
Director
Superfund Division

9-10-02
(Date)

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# List of Acronyms

| | |
|---|---|
| AWQC | Ambient Water Quality Criteria |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| CD | Consent Decree |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CWA | Clean Water Act |
| EPA | United States Environmental Protection Agency |
| ESD | Explanation of Significant Difference |
| MCL | Maximum Contaminant Level |
| MOMP | Monitoring, Operation and Maintenance Plan |
| NCP | National Contingency Plan |
| NPL | National Priorities List |
| O&M | Operation and Maintenance |
| PAH | Polyaromatic Hydrocarbon |
| PRP | Potentially Responsible Party |
| RA | Remedial Action |
| RAO | Remedial Action Objective |
| RCRA | Resource Conservation and Recovery Act |
| RD | Remedial Design |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| RPM | Remedial Project Manager |

# EXECUTIVE SUMMARY

The remedy for the Red Oak Landfill Superfund Site in Red Oak, Iowa, included capping of contaminated soils and wastes on site, construction of diversion and drainage structures, contouring and revegetation of the river bank slope, access and institutional controls, and groundwater monitoring. The site achieved construction completion with the signing of the Preliminary Close-Out Report on June 21, 2001. The trigger for this Five-Year Review was the actual start of construction on August 16, 1997.

The assessment of this Five-Year Review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). One Explanation of Significant Difference (ESD) was issued to change the cap design and the river bank slope shaping. The remedy is currently functioning as designed. The immediate threats have been addressed and the remedy is protective.

# Five-Year Review Summary Form

| SITE IDENTIFICATION | | |
|---|---|---|
| **Site name *(from WasteLAN)*:** Red Oak City Landfill Superfund Site | | |
| **EPA ID *(from WasteLAN)*:** IAD980632509 | | |
| **Region:** 7 | **State:** IA | **City/County:** Red Oak/Montgomery |
| **SITE STATUS** | | |
| **NPL status:** ☒ Final **G** Deleted **G** Other (specify) | | |
| **Remediation status** (choose all that apply): **G** Under Construction **G** Operating ☒ Complete | | |
| **Multiple OUs?*** **G** YES ☒ NO | **Construction completion date:** 6 / 21 / 2001 | |
| **Has site been put into reuse?** **G** YES ☒ NO | | |
| **REVIEW STATUS** | | |
| **Lead agency:** ☒ EPA **G** State **G** Tribe **G** Other Federal Agency | | |
| **Author name:** Bob Stewart | | |
| **Author title:** Remedial Project Manager | **Author affiliation:** U.S. EPA, Region 7 | |
| **Review period:**** 2 / 20 / 2002 to 8 / 31 / 2002 | | |
| **Date(s) of site inspection:** 6 / 6 / 2002 | | |
| **Type of review:** ☒ Post-SARA **G** Pre-SARA **G** NPL-Removal only **G** Non-NPL Remedial Action Site **G** NPL State/Tribe-lead **G** Regional Discretion) | | |
| **Review number:** ☒ 1 (first) **G** 2 (second) **G** 3 (third) **G** Other (specify) | | |
| **Triggering action:** **G** Actual RA On-Site Construction__ **G** Construction Completion **G** Other (specify) ☒ Actual RA Start at OU# NA **G** Previous Five-Year Review Report | | |
| **Triggering action date *(from WasteLAN)*:** 8 / 16 / 1997 | | |
| **Due date *(five years after triggering action date)*:** 8 / 16 / 2002 | | |

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

**Issues:**

The evidence of vehicle tracks in the vegetation of the cap, where authorized access vehicles for monitoring and maintenance left tracks directly up the slope of the cap. This was primarily due to the drought conditions present in the area.

The latest deed at the county recorder's office fails to mention the requirements of the state registry.

The north drainage channel near the gate was bare of rocks in places, and too many rocks were evident near the southern edge of the channel.

**Recommendations and Follow-Up Actions:**

A sign should be placed in the path of this track, notifying workers to drive around the slope rather than up it. Communication with these workers should also be done.

The state should address pertinent requirements of the state registry rules with the City, so that the latest deed accurately reflects these requirements.

The channel should be regraded to restore adequate rock cover to the entire channel.

**Protectiveness Statement(s):**

The remedy at the site, in its present state, is protective of human health and the environment. All threats at the site have been addressed through capping of contaminated soil and waste on site, construction of diversion and drainage structures, contouring and revegetation of the river bank slope, access and institutional controls, and groundwater monitoring.

**Long-Term Protectiveness:**

Long-term protectiveness of the remedial action will be verified by continuing inspections, maintenance, and sampling of surface and ground water at the site, as specified in the Monitoring Operation and Maintenance Plan (MOMP). Current data indicate no impacts to surface water from the landfill, and no exposure to ground water contaminants in the private wells in the surrounding area. Current monitoring indicates that the remedy is functioning as intended.

**Other Comments:**

None

**RED OAK LANDFILL SUPERFUND SITE**
**RED OAK, IOWA**
**FIRST FIVE-YEAR REVIEW REPORT**

## I. INTRODUCTION

The purpose of the Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA Section 121(c) states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with Section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR 300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency (EPA), Region 7, conducted the Five-Year Review of the remedy implemented at the Red Oak Landfill Superfund Site in Red Oak, Iowa. This review was conducted by the Remedial Project Manager (RPM) for the entire site from February 2002 through August 2002. This report documents the results of the review.

This is the first Five-Year Review for the Red Oak Landfill Site. The triggering action for this statutory review is the initiation of the remedial action on August 16, 1997. The Five-Year Review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

## II. SITE CHRONOLOGY

**Table 1 - Chronology of Site Events**

| Event | Date |
|---|---|
| Limestone quarry activities at the site | 1947-1962 |
| City purchased property and operated it as a landfill | 1962-1974 |
| Superfund 103(c) Notification by Union Carbide and Uniroyal | 1981 |
| Final listing on EPA National Priorities List | 3/31/1989 |
| Administrative Order on Consent for Remedial Investigation/Feasibility Study (RI/FS) | 12/4/1989 |
| Remedial Investigation/Feasibility Study made available to public | 8/1992 |
| Proposed plan identifying EPA's preferred remedy presented to public; start of public comment period. | 8/1992 |
| ROD selecting the remedy is signed | 3/31/1993 |
| Explanation of Significant Difference (ESD) to change cap design and river bank slope shaping | 1/30/1996 |
| Consent Decree (CD) finalizing settlement for responsible party performance of remedy entered by Federal Court | 11/27/1996 |
| Start of on-site construction (date that triggers Five-Year Review). | 8/16/1997 |
| Completion of on-site construction | 11/21/1997 |
| Cap and slope repairs completed | 11/1998 |
| Additional slope repairs completed | 11/1999 |
| Pre-final inspection of remedial action | 10/27/1999 |
| Preliminary Close Out Report signed | 6/21/2001 |

| Event | Date |
|---|---|
| O&M Plan approved by EPA | 9/29/1999 |
| EPA Certification of Completion of the Remedy | Not yet certified |

## III. BACKGROUND

### Physical Characteristics

The Red Oak Landfill site occupies 40 acres in Montgomery County, Iowa, located about 1.5 miles northwest of the city of Red Oak (City) on the west bank of the East Nishnabotna River and on the east side of Parkwest Road, now known as G Avenue. Red Oak is a community of approximately 6300 residents.

### Land and Resource Use

The site was originally a limestone quarry which operated from the late 1940s to the early 1960s. The city of Red Oak purchased the property in 1962 and operated it as a landfill until it closed in April 1974. Current surrounding land use is agricultural. The East Nishnabotna River is used for fishing. It is anticipated that land use in the surrounding area will remain similar to current uses. The site is currently fenced and posted with warning signs, and the landfill waste is contained within the fenced area under an impermeable cap. The groundwater beneath the site is not currently used as a drinking water source, although there are 14 groundwater wells within a one-mile radius used for drinking water or nonpotable uses. These wells are not downgradient of the facility, since the dominant groundwater flow direction is to the southeast toward the East Nishnabotna River.

### History of Contamination

Wastes disposed of at the site reportedly included construction and demolition debris, tree pruning waste, municipal refuse, and industrial waste from facilities in the Red Oak area. These industrial wastes included toluene, methyl isobutyl ketone, tetrachloroethylene, mineral spirits, diacetone alcohol, laminated paper containing approximately three percent mercurous chloride from battery production, and drummed filter cake containing lead. The site posed a threat to the public health through direct contact, slope erosion, and potential leaching and migration of contaminants into surface water and groundwater.

### Initial Response

The site was proposed to the National Priorities List (NPL) on June 10, 1986, and became final on March 31, 1989. An Administrative Order on Consent for the RI/FS was effective on December 4, 1989, and the responsible parties conducted the RI/FS under EPA oversight. In August 1992, the proposed plan identifying the preferred remedy was presented to the public for their review and comment, along with the RI/FS reports.

### Basis for Taking Action: Contaminants

Hazardous substances that have been released at the site include aluminum, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, zinc, acetone, 1,2-dichloroethene, tetrachloroethene, bis(2-ethylhexyl) phthalate, and polycyclic aromatic hydrocarbons (PAHs). These contaminants were of concern primarily in the surface soil and exposed waste. Exposures to soil and exposed waste are associated with significant human health risks due to exceedance of EPA's risk management criteria for either the average or the reasonable maximum exposure scenarios. The carcinogenic risks were highest for exposure to soil and waste due to the concentrations of carcinogenic PAHs. Noncarcinogenic hazards were highest for exposure to soil and waste due to lead, manganese, and cadmium. Exposure to contaminated groundwater at the site was determined not to represent a significant exposure pathway.

## IV. REMEDIAL ACTIONS

### Remedy Selection

The Record of Decision (ROD) for the Red Oak Landfill site was signed on March 31, 1993. The Remedial Action Objectives (RAOs) were developed as a result of data collected during the remedial investigation to aid in the development and screening of remedial alternatives to be considered for the ROD. The RAOs for the site were to:

1. Reduce or eliminate the threat of direct contact with, ingestion of, or inhalation of materials containing acetone, 1,2-dichloroethene, tetrachloroethene, toluene, and other contaminants contained in soil and waste buried at the site;

2. Reduce surface water infiltration through the buried waste materials to minimize the potential for leaching of contaminants from the waste materials to groundwater and surface water;

3. Control erosion of the river bank slope to minimize the potential for exposure of buried waste materials; and

4. Address potential exposure to increased contaminant levels in the future due to erosion of existing surficial materials.

The major components of the remedy selected in the ROD include:

1. Installation of an engineered low-permeability cap over the surface of the landfill;

2. Construction of diversion and drainage structures to manage surface drainage resulting from the reduced permeability of the landfill cover;

3. Stabilization of the river bank slope by contouring and revegetation along with further study of the stability of the slope;

4. Access control provided by a perimeter fence around the landfill area;

5. Institutional controls, including deed and access restrictions, to control future land use at the site; and

6. Long-term groundwater monitoring to evaluate the effectiveness of the remedy and ensure groundwater contaminant levels remain protective.

An ESD was issued on January 30, 1996. Based on negotiations with the responsible parties, EPA determined that river bank slope shaping could be limited, the landfill cap could be reduced in thickness, the slope study and further stabilization measures could be eliminated and costs could be reestimated. These changes were incorporated into the ESD.

Institutional controls were required for the site. These controls were sought in two ways. First, before remediation, the state had already placed the site on Iowa's Registry of Hazardous Waste or Hazardous Substance Disposal Sites, which prevents changes in land ownership or use without state approval. A registry notice was put in place by the state. Second, under the 1996 CD with the EPA, the individuals owning the site granted an easement to the city containing restrictive covenants that limited future uses of the site.

However, at the time the CD negotiations were nearing completion, EPA knew that the city (which was also a potentially responsible party (PRP) at the site) was likely to accept the landfill as a gift from the individual owner's estate. (The owner died during negotiations, and the city, since they were already a PRP, was willing to aid in the resolution of the owner's estate by accepting ownership of the former city landfill property.) We knew that the city accepting the fee interest in this property would cause the required easement being furnished to us to be "extinguished," i.e., to be effectively cancelled. To deal with this contingency, a provision was added to the CD requiring that if the city should ever become the owner, whenever it would subsequently sell the property, it would be required to retain an easement of

the same form previously required of the prior owner.

At the present time, the city continues to own the property. While the easement that we originally sought is no longer in effect at the present time, the deed granting the property to the city, filed seven months after the consent decree became final, does contain some simple language which acts as a deed notice and acknowledges the grantee's assumption (i.e., the city's assumption) of the requirements of the CD concerning this real estate.

## Remedy Implementation

In a CD signed with EPA on November 27, 1996, the responsible parties agreed to perform the remedial design/remedial action (RD/RA) and pay past costs for cleaning up the site. The RD was conducted in conformance with the ROD as modified by the ESD. The RD was approved by EPA on July 28, 1997.

The RA was initiated on August 16, 1997, and the initial construction activities were completed on November 21, 1997. The PRPs were divided into three groups according to the obligations they took on: The construction parties, consisting of Eveready Battery and its parent; a group of operation and maintenance (O&M) parties consisting of Magna International and the City; and a group of cashout parties. Construction of the remedy was initially thought to be completed in November 1997. However, areas of failure of both the landfill cap and the riverbank slope were discovered in the spring of 1998. The cap was repaired in May 1998, and the slope was repaired in September 1998. In February 1999, the dispute provision of the CD was invoked by Eveready, concerning EPA's declination to view the entire remedy as completed. No formal statement of dispute was ever filed by Eveready at the time, and the dispute was allowed to lapse. A May 1999 site visit was set to inspect both the slope and cap, but before this meeting occurred, a second failure of the slope was discovered in the spring of 1999. Additional lab analysis was conducted to find the cause, and repairs were made in July and September 1999. It was agreed that an inspection of the project site would be conducted in October 1999, to verify that there was an adequate growth of new vegetation on the cap and slope. EPA conducted a prefinal inspection on October 27, 1999, which resulted in a "punch list" of identified construction deficiencies, mostly minor in nature. The punch list items for the cap included mowing, weed control, drainage ditch vegetation removal, erosion repair, monitoring well functionality, placement of warning signs, and removal of a silt fence. EPA determined, once these punch list items were satisfactorily completed, construction of the cap and its accompanying drainage structures would be considered completed in accordance with the ROD, ESD and RD. We then notified the construction and O&M parties in October 2000 that the cap portion of the remedy was now operational and ready to be maintained by the O&M parties.

The remaining items on the punch list of concern to EPA were slope revegetation and slope stability. EPA had declared the cap remedy operational but final certification of the remedy awaited further assurance that the slope would survive the thaw season during a wet spring. The spring of 2000 was relatively dry, and the spring of 2001 was relatively wet. Based on the observation that little additional damage to the slope occurred in the winter of 2000-2001, the EPA determined that construction of the remedy as embodied in the RD had been completed. The construction completion designation was achieved when the Preliminary Close Out Report was signed on June 21, 2001. The EPA stated its intention to carefully monitor the landfill over the next several winters to obtain more assurance that the slope would hold. If additional damage occurred, repairs and/or other measures would be needed, and this would extend the period of monitoring. If the damage was again extensive, it would be necessary to consider additional remedies through a ROD amendment. EPA reserved all of its rights to require additional remedies through a ROD amendment. EPA reserved all of its rights to require additional revegetation work or other remedies as required in the event of further slope deterioration. The determination of construction completion was not intended to have any legal or financial significance, or to determine that the requirements of the CD and its statement of work had been satisfied, nor to bear on the eligibility of any cost reimbursement that might be sought from the EPA Superfund. After the slope is determined to be adequate, EPA will issue a Final Close Out Report.

The winter of 2001-2002 was relatively dry, and no further damage to the slope was observed at the site inspection conducted June 6, 2002. Vegetation on the slope is in generally good shape, and seedling poplar and willow trees were observed to be growing on portions of the slope. These trees will assist in maintaining stability on the slope.

**System Operation, Operation and Maintenance**

The O&M parties are conducting groundwater monitoring and maintenance activities on the landfill cap pursuant to the Monitoring Operation and Maintenance Plan (MOMP) that was approved by EPA on September 29, 1999. The primary activities associated with the MOMP include:

1. Inspection of the landfill cap, drainage structures, and river bank slope with regard to vegetative cover, settlement, stability, fencing, and monitoring well protection, including any necessary repairs; (Annual reseeding will be done as necessary, and semiannual mowing and noxious weed control will also be done.)

2. Conducting groundwater and surface water sampling semiannually for the first two years, followed by annual sampling; and

3. The sampling of landfill seeps occurring on the river bank slope.

Those portions of the MOMP associated with the river bank slope have not yet been activated because the slope maintenance has not yet been turned over to the O&M parties.

O&M costs include cap and drainage structure maintenance, sampling and monitoring efforts, monitoring well maintenance, mowing, seeding, and noxious weed control. The ROD estimated that annual O&M costs would be about $65,000 per year for the first five years and $45,000 thereafter. At this date, a full year of the entire O&M scenario has not yet been carried out. Based on costs received from the parties responsible for the O&M, the ROD estimate appears to be a reasonable estimate; about $51,000 was spent on cap maintenance and monitoring last year.

## V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This was the first Five-Year Review for the site.

## VI. FIVE-YEAR REVIEW PROCESS

### Administrative Components

Members of the responsible parties and the state of Iowa were notified of the initiation of the Five-Year Review. The Red Oak Landfill Five-Year Review team was led by Bob Stewart, (RPM) for the site, and included Bob Drustrup, Iowa Dept of Natural Resources (IDNR). The review was conducted between February 20, 2002, and August 31, 2002. It included community involvement, document review, data review, site inspection, local interviews, and report development and review.

### Community Involvement

Activities to involve the community in the Five-Year Review were initiated in February 2002 by the RPM and the Community Involvement Coordinator for the site. A notice was published in the Red Oak Express on May 7, 2002, and a fact sheet was sent to parties on the EPA mailing list explaining the initiation of the Five-Year Review. The notice and fact sheet invited the public to submit any comments to EPA. No comments were received.

Soon after approval of this report, a notice will be placed in the same local newspaper announcing that the Five-Year Review is complete, and that the results of the review and the report are available to the public at the Red Oak Public Library and the EPA Region 7 library.

### Document Review

This Five-Year Review included a review of relevant documents including O&M records and monitoring data.

## Data Review

Groundwater monitoring was first conducted at the site in March and April 1990 after the site monitoring wells were installed in 1989. The results of these two rounds of tests indicated that contaminants were present in the groundwater, but exposure to contaminated groundwater at the site was determined not to represent a significant exposure pathway. In 1990, only dissolved samples were run for metals. Arsenic and nickel slightly exceeded the drinking water standards, and manganese exceeded the secondary drinking water standards for taste and odor concerns.

Since the MOMP was implemented, three rounds of groundwater monitoring were conducted in May and October 2001 and in May 2002. The samples were evaluated for both total and dissolved metals. Contaminant concentrations were similar to the 1990 results with some slight differences. In October, total lead was determined to be slightly over the drinking water level of 15 ug/l in the background well and in two others; dissolved concentrations were less than the standard. No lead exceedances were observed in the May 2002 sampling. In all three sampling events, total chromium was in exceedance of the Maximum Contaminant Level (MCL) in one well. Dissolved chromium exceeded the MCL in the first event but not the last two events. Similarly, in the same well total nickel exceeded in all events, but the dissolved nickel levels only exceeded the MCLs on the first and third events.

**Table 2 - Semiannual Comparison of Groundwater Concentrations**

| Contaminant | Well No. | MCL (ppb) | Concentration in ppb | | |
|---|---|---|---|---|---|
| | | | May 2001 | Oct 2001 | May 2002 |
| Lead | 1 | 15 | ND | 16/ND | ND |
| Lead | 3 | 15 | ND | 19/ND | ND |
| Lead | 5 | 15 | ND | 19/ND | ND |
| Chromium | 2 | 100 | 392/358 | 169/ND | 111/ND |
| Nickel | 2 | 100 | 137/132 | 101/14 | 322/184 |

ND = Not Detected
Concentrations listed as Total/Dissolved where applicable

As required in the MOMP, a groundwater use review was conducted in the fall of 2001. Fourteen wells were located within one mile of the site with about half used only for nonpotable uses. None of these wells were downgradient of the site, as the groundwater flow is southeasterly to the East Nishnabotna River. EPA continues to believe that contaminants are present in the groundwater, but exposure to contaminated groundwater at the site is not an exposure pathway. No transformation products have been identified at the site, and none are expected.

## Surface Water Monitoring

Surface water samples were also obtained from upstream and downstream locations in May and November 2001 and May 2002. No significant differences were noted between the upstream and downstream data for all constituents of concern and; therefore, we believe any contaminated groundwater reaching the river is having no measurable impacts on the water quality of the river.

## Site Inspection

An inspection was conducted at the site on June 6, 2002, by the RPM. The purpose of the inspection was to assess the protectiveness of the remedy, including the presence of fencing to restrict access, the integrity of the cap and the groundwater monitoring wells, and the condition of the river bank slope and drainage structures. Institutional controls were evaluated by visiting the County Recorder of Deeds to review the notice on the deed. The most recent deed, in May 1997, contained the restrictions called for in the CD, but did not mention the state registry.

Examination of the site revealed no major problems. Fencing and signs were in place, and no evidence of trespassing was noted. The necessary O&M documents were available with the City officials. The access controls and institutional controls have been effective in preventing the use or disturbance of the cap in any way that might interfere with the remedy. No activities were observed that violated the institutional controls. The cap, slope, and surrounding areas were undisturbed and no uses of groundwater or surface water that would result in new exposures was observed.

The landfill surface was in excellent condition. No settlement, cracking, erosion, or holes were noted. The vegetative cover was well established, and no problems were evident except for vehicle tracks up the north slope of the cap, which were evident because of the drought conditions. To prevent any erosion in such areas, EPA recommends the installation of a sign and provision of instructions to maintenance workers to drive around the slope rather than straight up the slope. As noted above, the riverbank slope was in generally good shape with some small areas of deficient vegetation. No new slippage areas were noted from the previous winter, and the construction PRPs had conducted some repair work on these small areas to improve the vegetative cover. For the most part, the slope is vegetating nicely, and even some small poplar and willow trees were observed on the slope. These were volunteer trees that will aid in maintaining stability of the slope without harming the cap.

The drainage channels were in good shape as well. They were clear of vegetation and free from erosion damage. One area of the north drainage channel near the gate needs some minor regrading to spread the rock over the entire channel. Monitoring wells were in good shape.

## Interviews

Interviews were conducted during the site inspection with City officials Bill Hoffel, Superintendent; Tom

Bentley, Assistant; Brad Wright,City Administrator; and Mayor James Johnston. No problems were reported by any interviewee.

## VII. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents, Applicable or Relevant and Appropriate Requirements (ARAR), risk assumptions, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD, as modified by the ESD. The capping of the landfill has achieved the remedial objectives of reducing or eliminating the threat of direct contact with, ingestion of, or inhalation of contaminants contained in soil and waste buried at the site, and of reducing surface water infiltration through the buried waste materials in order to minimize the potential for leaching of contaminants from the waste materials to groundwater and surface water. The effective implementation of access and institutional controls has prevented exposure as well.

The O&M of the cap and drainage structures has been effective. There are no indications of any difficulties with the cap and drainage structures. As previously mentioned, there have been vegetation problems with the slope. Based on the site inspection, it appears the slope is holding well at present. Since O&M of the slope has not really begun, we cannot comment on its effectiveness yet. The second Five-Year Review will address the O&M of the slope in more detail.

There were no opportunities for system optimization observed during this review. The monitoring well network provides sufficient data to evaluate the effectiveness of the remedy and ensure groundwater contaminant levels remain protective. Maintenance of the cap, fence, and drainage structures is sufficient to maintain their integrity. Maintenance of the slope has not provided enough of a history to provide an opportunity for optimization yet. No activities were observed that have violated the institutional controls. The cap, slope, and surrounding areas were undisturbed and no uses of groundwater or surface water that would result in new exposures was observed. The fence around the landfill is intact and in good repair.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

1. Changes in Standards and To Be Considereds

The remedial construction work at the site has been completed, and all ARARs cited in the ROD have

been met. Monitoring to meet the river quality impacts will be continued under the provisions of the MOMP. A list of ARARs is included in Attachment 3. Although there have been changes to the Iowa sanitary landfill closure regulations since the remedy was selected and built, no changes are needed to assure protectiveness of the remedy since the remedy complies with the new standards as well as the old. The final cover requirements of 567 IAC 103 are met by providing an 18-inch layer of earthen material less permeable than the natural subsoils beneath the landfill and an 18-inch top layer which exceeds the newly-required 6-inch layer.

2. Changes in Exposure Pathways, Toxicity, and other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (adult hunter/trespasser scenario) and potential future exposures (future child resident, future adult resident, and future adult excavation worker). There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions, or the cleanup levels developed from them, is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

In the ROD, the ecological risks at the site were judged to be minimal. Additional river sampling conducted after the RA has continued to show no discernible impact to the river from the landfill. No additional risks to the environment have been identified in the Five-Year Review. Weather-related events in 1998 and 1999 did cause damage to the slope and cap, but have not been repeated since. This was partially because of the improved vegetative cover on both slope and cap, and partially because the weather events have not been as severe. Additional maintenance and inspection of the cap and slope will continue to observe the impacts of any subsequent adverse weather events. We believe that the current land use of the site will not change, and there is little potential for redevelopment. There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD, as modified by the ESD. There have been no changes in the physical conditions at the site that would affect the protectiveness of the remedy. The ARARs cited in the ROD have been met. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

## VIII. ISSUES

### Table 3 - Issues

| Issue | Currently Affects Protectiveness (Y/N) | Affects Future Protectiveness (Y/N) |
|---|---|---|
| Evidence of vehicle tracks in the vegetation of the cap, where authorized access vehicles for monitoring and maintenance left tracks directly up the slope of the cap. This was primarily due to the drought conditions present in the area. | N | N |
| The latest deed at the county recorder's office fails to mention the requirements of the state registry | N | N |
| North drainage channel near the gate was bare of rocks in places, and too many rocks were evident near the southern edge of the channel. | N | N |

## IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

**Table 4 - Recommendations and Follow-Up Actions**

| Issue | Recommendations/ Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness? (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| Vehicle tracks up the slope | Sign should be placed in the path of this track notifying workers to drive around the slope rather than up it. Communication with these workers should also be done. | City | State/EPA | 8/30/2002 | N | N |

| Issue | Recommendations/ Follow-up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness? (Y/N) | |
|---|---|---|---|---|---|---|
| | | | | | Current | Future |
| Deed reference to state registry | The state should address pertinent requirements of the state registry rules with the City so that the latest deed accurately reflects these requirements. | State and City | State/EPA | 9/30/02 | N | N |
| North Drainage Channel | Channel should be regraded to restore adequate rock cover to the entire channel. | City | State/EPA | 9/30/2002 | N | N |

## X. PROTECTIVENESS STATEMENT

The remedy at the site is protective of human health and the environment. All threats at the site have been addressed through capping of contaminated soil and waste on site, construction of diversion and drainage structures, contouring and revegetation of the river bank slope, access and institutional controls, and groundwater monitoring.

Long-term protectiveness of the RA will be verified by continuing inspections, maintenance, and sampling of surface and groundwater at the site as specified in the MOMP. Current data indicate no impacts to surface water from the landfill and no exposure to ground water contaminants in the wells in the surrounding area. Current monitoring indicates that the remedy is functioning as intended.

## XI. NEXT REVIEW

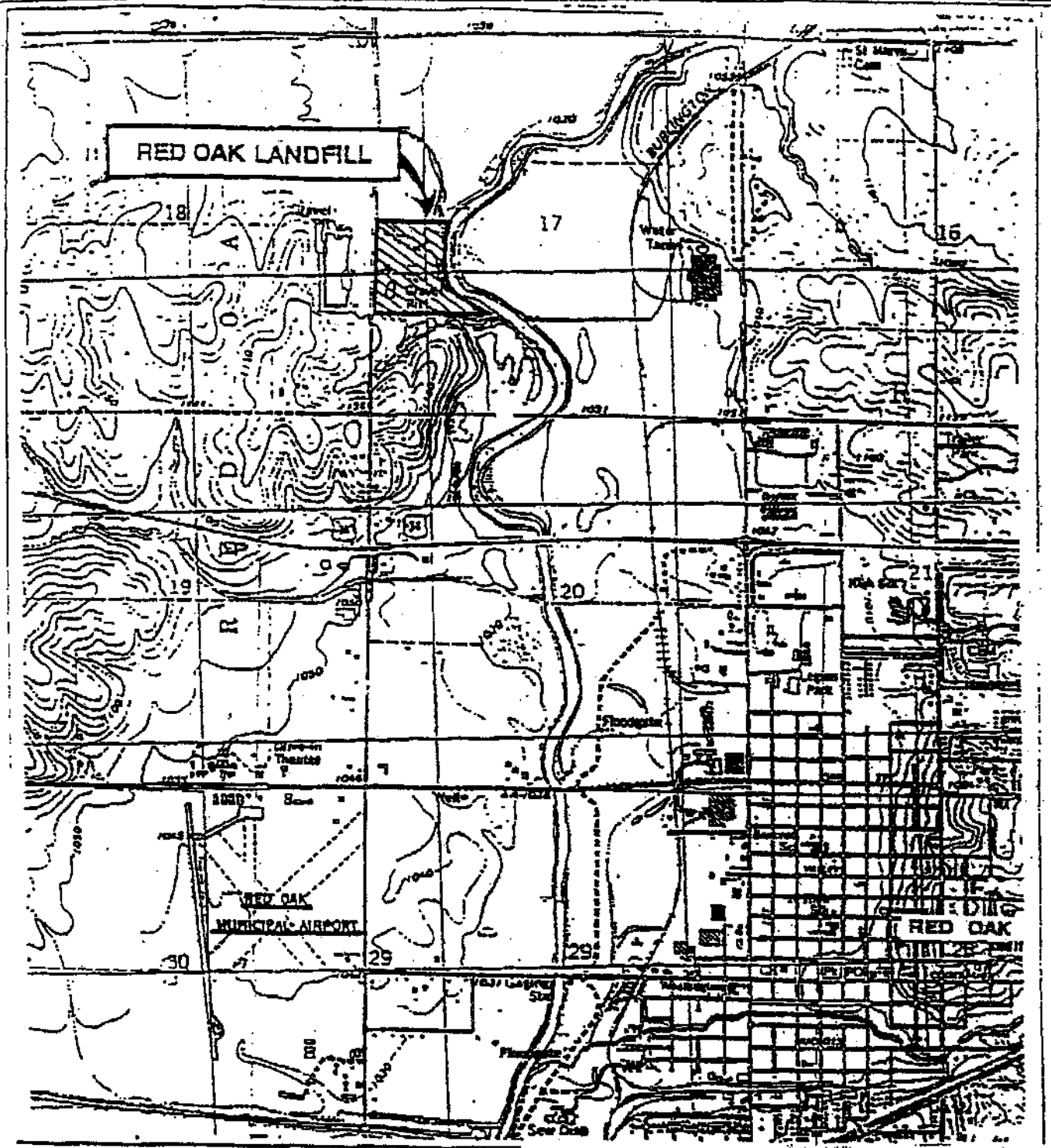
The next Five-Year Review for the Red Oak Landfill Superfund Site is required by September 2007,

five years from the date of this review.

# ATTACHMENTS

# ATTACHMENT 1

## Site Location Map




TITLE FIGURE 1

SITE LOCATION MAP

RED OAK LANDFILL SUPERFUND SITE

RED OAK, IOWA

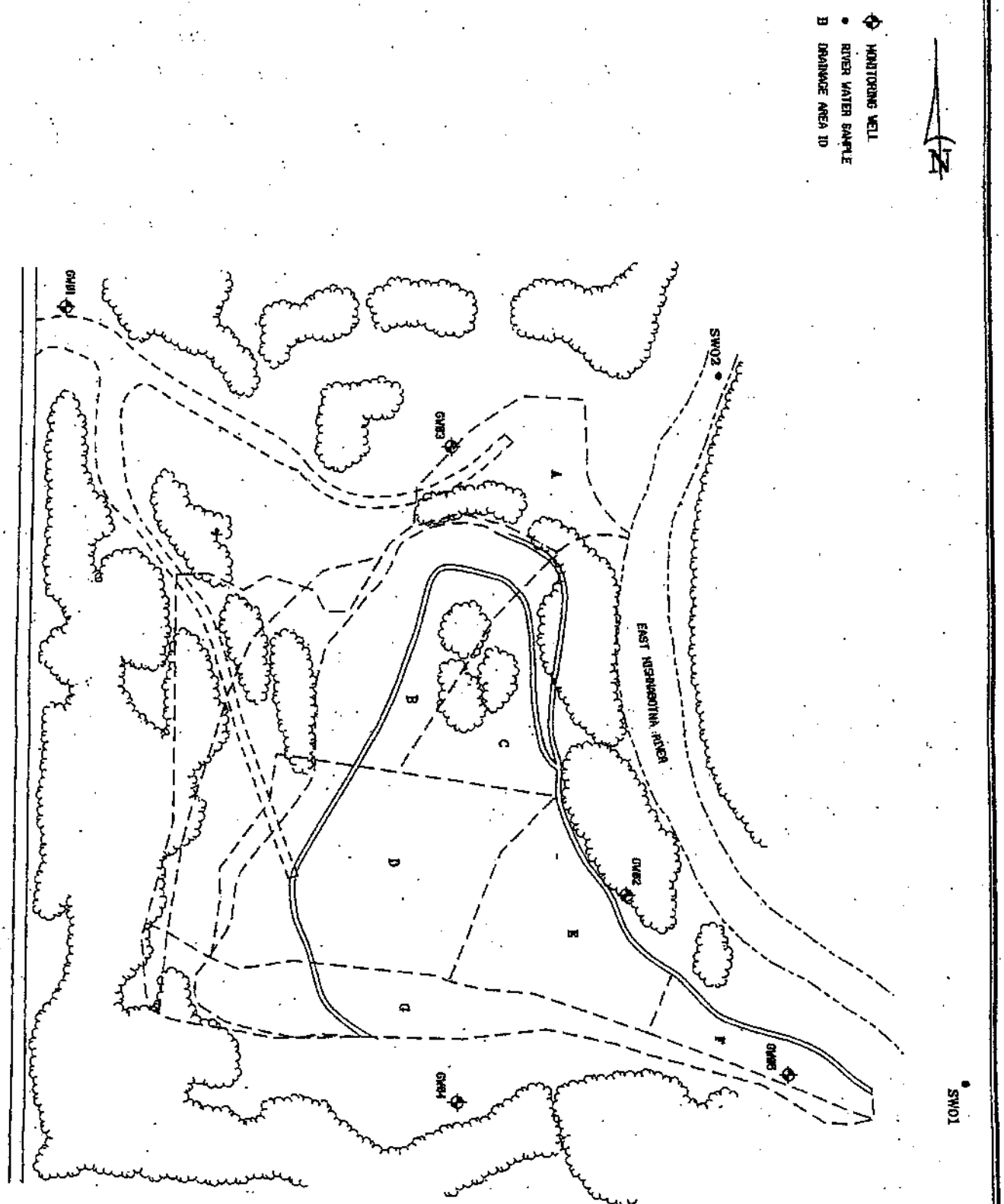
VATC ASSOCIATES INC.

Raleigh, North Carolina 27615 (919)871-0999 FAX (919)871-0335

| CAD FILE | TYPE CODE | PREP. BY | REV. BY | SCALE | DATE | PROJECT NO. |
|---|---|---|---|---|---|---|

# ATTACHMENT 2

**Site Plan**




NOTES:

TITLE FIGURE 2
SITE PLAN AND MONITORING WELL LOCATIONS
RED OAK LANDFILL SUPERFUND SITE
RED OAK, IOWA

ATC ASSOCIATES INC.
Raleigh, North Carolina 27615 (919)871-0999 FAX (919)871-0335

| CAD FILE | TYPE CODE | PREP. BY | REV. BY | SCALE | DATE | PROJECT NO. |
|---|---|---|---|---|---|---|

# ATTACHMENT 3

## List of Documents Reviewed

Consent Decree, United States v. Eveready Battery Co, Inc, et al, November 27, 1996

Explanation of Significant Differences, Red Oak Landfill Site, January 30, 1996

Monitoring, Operation and Maintenance Plan, Red Oak Landfill Site, June 11, 1999

Monitoring, and Maintenance Plan Report, Red Oak Landfill Superfund Site, June 28, 2001

Monitoring, and Maintenance Plan Report, Red Oak Landfill Superfund Site, December 28, 2001

Monitoring, and Maintenance Plan Report, Red Oak Landfill Superfund Site

Preliminary Close Out Report, Red Oak Landfill Site, June 21, 2001

Record of Decision, Red Oak Landfill, March 31, 1993

Remedial Design, Red Oak Landfill Site, July 28, 1997

# ATTACHMENT 4

## Applicable or Relevant and Appropriate Requirements (ARARs)

| Medium/ Authority | ARAR | Status | Requirement Synopsis | Action to be taken to Attain ARAR |
|---|---|---|---|---|
| Surface Water/Clean Water Act (CWA) | Federal - CWA - Ambient Water Quality Criteria (AWQC)- Protection of Freshwater Aquatic Life, Human Health, Fish Consumption | Relevant & Appropriate | AWQC are developed under the CWA as guidelines from which states develop water quality standards. CERCLA §121(d)(2) requires compliance with such guidelines when they are relevant and appropriate. A more stringent AWQC for aquatic life may be found relevant and appropriate rather than an MCL, when protection of aquatic organisms is being considered at a site. Federal AWQC are health-based criteria which have been developed for 95 carcinogenic compounds; these criteria consider exposure to chemicals from drinking water and/or fish from drinking water and/or fish consumption. Acute and chronic exposure levels are established from drinking water and/or fish consumption. Acute and chronic exposure levels are established. | The selected remedy has attained AWQC in the river water. River sampling continues to show no discernible impact from the site upon the river. |

| Medium/ Authority | ARAR | Status | Requirement Synopsis | Action to be taken to Attain ARAR |
|---|---|---|---|---|
| Floodplains/ Resource Conservation and Recovery Act (RCRA) | Federal 40 Code of Federal Regulations (CFR) Part 264.18 Location Standards | Relevant & Appropriate | This regulation identifies geological features that a proposed location for a RCRA hazardous waste treatment and/or disposal facility must avoid. Three specific geological features are identified of which one applies to the site. This feature and the significance is:<br><br>Floodplain - A facility located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste unless the owner or operator can demonstrate to the EPA Regional Administrator that he can meet the criteria established under this subpart which exempts him from complying with this requirement. | This site is located within a 100-year floodplain. On-site remediation activities complied with the requirements of 40 CFR Parts 264.18(a) and (b) to prevent washout of the landfill waste. |

| Medium/ Authority | ARAR | Status | Requirement Synopsis | Action to be taken to Attain ARAR |
|---|---|---|---|---|
| Solid Waste | State Solid Waste 567 IAC 103 & 110 | Relevant & Appropriate | Sanitary landfill monitoring, closure, and post-closure regulations were considered relevant and appropriate. | These requirements were met in the design of the cap, and MOMP requirements for post-closure care and groundwater monitoring. Revised (new) requirements of 567 IAC 103 have also been satisfied by the existing remedy. |
| Air/Clean Air Act & State Air Act | 567 IAC 28 | Relevant & Appropriate | These standards were considered to apply to the site during and after construction. Fugitive dust during construction and land fill emissions after construction applied. | Efforts were made during construction to control fugitive dust, and the cap was designed to consider landfill emissions. |